

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

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1. (Currently Amended) A method of recognizing an object based on pattern matching using a gray-scale normalized correlation method, comprising the steps of:

storing a reference image including a foreground and a background, said foreground and said background each having a predetermined value of density distribution;

inputting an image of the object, said image including a foreground and a background, said foreground and said background each having a predetermined average value of density distribution;

storing a function for giving said predetermined values of density distribution of said reference image equal to said predetermined average values of density distribution of said input image, respectively; and

obtaining a ~~maximum~~ normalized correlation coefficient between said reference image and said input image using said function.

2. (Original) The method as claimed in claim 1, wherein said function is such that said reference image is high in said predetermined value of density distribution of said foreground, and low in said predetermined value of density distribution of said background.

3. (Original) The method as claimed in claim 1, wherein said function is such that said reference image is low in said predetermined value of density distribution of said foreground, and high in said predetermined value of density distribution of said background.

4. (Currently Amended) The method as claimed in claim ~~[[2]]~~ 1, wherein said function is obtained by designating a pattern of said reference image, overlaying an image of said pattern on said input image, and designating

one of a predetermined average value of density distribution of said image and a predetermined value of density of said image.

Q 5. (Currently Amended) The method as claimed in claim [[2]] 1, wherein said function is obtained by extracting an outline of the object, overlaying an image of said outline on said input image, and designating one of a predetermined average value of density distribution of said image and a predetermined value of density of said image.

6. (Currently Amended) The method as claimed in claim 1, wherein said ~~maximum~~ normalized correlation coefficient is obtained from simple summation of said cross-correlation coefficient

7. (Currently Amended) A method of recognizing an object based on pattern matching using a gray-scale normalized correlation method, comprising the steps of:

storing a reference image including a foreground, said foreground having a predetermined value of density distribution;

inputting an image of the object, said image including a foreground, said foreground having a predetermined average value of density distribution;

storing a function for giving said predetermined value of density distribution of said reference image equal to said predetermined average value of density distribution of said input image; and

obtaining a ~~maximum~~ normalized correlation coefficient between said reference image and said input image using said function.

8. (Currently Amended) The method as claimed in claim 7, wherein said function is obtained by designating a pattern of said reference image, overlaying an image of said pattern on said input image, and designating one of a predetermined average value of density distribution of said image and a predetermined value of density of said image.

9. (Currently Amended) The method as claimed in claim 7, wherein said function is obtained by extracting an outline of the object, overlaying an image of said outline on said input image, and designating one of a predetermined ~~average~~ value of density distribution of said image and a predetermined value of density of said image.

Q 10. (Currently Amended) The method as claimed in claim 7, wherein said ~~maximum~~ normalized correlation coefficient is calculated ~~in-excluding~~ with a term of [[a]] said background of said reference image excluded from an equation of an autocorrelation coefficient of each of said reference image and said input image and an equation of a cross-correlation coefficient between said reference image and said input image.

11. (Currently Amended) The method as claimed in claim 7, wherein said ~~maximum~~ normalized correlation coefficient is obtained from simple summation of said cross-correlation coefficient.

12. (Currently Amended) A medium for recording a computer program having a method of recognizing an object based on pattern matching using a gray-scale normalized correlation method, the method comprising the steps of:

storing to a reference image including a foreground and a background, said foreground and said background each having a predetermined value of density distribution;

inputting an image of the object, said image including a foreground and a background, said foreground and said background each having a predetermined ~~average~~ value of density distribution;

storing a function for giving said predetermined values of density distribution of said reference image equal to said predetermined ~~average~~ values of density distribution of said input image, respectively; and

obtaining a ~~maximum~~ normalized correlation coefficient between said reference image and said input image using said function.

13. (Currently Amended) A medium for recording a computer program having a method of recognizing an object based on pattern matching using a gray-scale normalized correlation method, comprising the steps of:

storing a reference image including a foreground, said foreground having a predetermined value of density distribution;

inputting an image of the object, said image including a foreground, said foreground having a predetermined average value of density distribution;

storing a function for giving said predetermined value of density distribution of said reference image equal to said predetermined average value of density distribution of said input image; and

Q obtaining a ~~maximum~~ normalized correlation coefficient between said reference image and said input image using said function.

14. (Newly Added) The method as claimed in claim 1, wherein said reference image storing step is carried out only once.

15. (Newly Added) The method as claimed in claim 7, wherein said reference image storing step is carried out only once.

16. (Newly Added) The method as claimed in claim 12, wherein said reference image storing step is carried out only once.

17. (Newly Added) The method as claimed in claim 13, wherein said reference image storing step is carried out only once.

18. (Newly Added) A method of recognizing an object based on pattern matching using a gray-scale normalized correlation method, comprising:

storing a reference image including a foreground and a background, the foreground and the background providing a predetermined density condition;

inputting an image of the object, the image including a foreground and a background, the foreground and the background providing a predetermined density condition;

obtaining a function for giving the predetermined density condition of the reference image corresponding to the predetermined density condition of the input image; and

calculating a normalized correlation coefficient between the reference image and the input image using the function.

19. (Newly Added) The method as claimed in claim 18, wherein the reference image storing step is carried out only once.

20. (Newly Added) The method as claimed in claim 18, wherein the predetermined density condition of the reference image comprises density distributions of the foreground and the background of the reference image.

21. (Newly Added) The method as claimed in claim 18, wherein the predetermined density condition of the reference image comprises a contrast pattern of the foreground and the background of the reference image.

22. (Newly Added) The method as claimed in claim 15, wherein the predetermined density condition of the input image comprises density distributions of the foreground and the background of the input image.

23. (Newly Added) The method as claimed in claim 18, wherein the predetermined density condition of the input image comprises a contrast pattern of the foreground and the background of the input image.

24. (Newly Added) The method as claimed in claim 20, wherein one of the density distributions of the reference image is high, and another is low.

25. (Newly Added) The method as claimed in claim 18, wherein the obtaining step is carried out by designating a pattern of the reference image,

overlaying an image of the pattern on the input image, and designating one of a density distribution of the image and a density of the image.

26. (Newly Added) The method as claimed in claim 18, wherein the obtaining step is carried out by extracting an outline of the object wherein an area inside the outline serves as the foreground and an area outside the outline serves as the background, overlaying an image of the outline on the input image, and designating one of a density distribution of the image and a density of the image.

27. (Newly Added) The method as claimed in claim 15, wherein the calculating step is carried out by simple summation of a cross-correlation coefficient.

28. (Newly Added) The method as claimed in claim 18, wherein the calculating step is carried out with respect to the normalized correlation coefficient between the foreground of the reference image and the foreground of the input image only.

29. (Newly Added) The method as claimed in claim 28, wherein the calculating step is carried out with a term of the background of the reference image excluded from an equation of an autocorrelation coefficient of each of the reference image and the input image and an equation of a cross-correlation coefficient between the reference image and the input image.

30. (Newly Added) A medium for recording a computer program having a method of recognizing an object based on pattern matching using a gray-scale normalized correlation method, the method comprising:

storing a reference image including a foreground and a background, the foreground and the background providing a predetermined density condition;

inputting an image of the object, the image including a foreground and a background, the foreground and the background providing a predetermined density condition;

obtaining a function for giving the predetermined density condition of the reference image corresponding to the predetermined density condition of the input image; and

Q1 calculating a normalized correlation coefficient between the reference image and the input image using the function.

31. (Newly Added) The method as claimed in claim 30, wherein the reference image storing step is carried out only once.